

CLAIMS

[0043] What is claimed is:

1. An apparatus comprising:
 - a base structure; and
 - a cap layer attached to a top surface of said base structure and able to support one or more elements of an electro-mechanical device,
 - wherein one or more cavities encapsulated between said base structure and said cap layer are sealed from an external environment.
2. The apparatus of claim 1, wherein said base structure comprises one or more protrusions attached to a base substrate, and wherein said one or more cavities are encapsulated between said cap layer, said base substrate and said protrusions.
3. The apparatus of claim 2, wherein said one or more protrusions comprise an insulating material.
4. The apparatus of claim 2, wherein said base substrate comprises a semiconductive material.
5. The apparatus of claim 1, wherein said one or more elements comprises a membrane.
6. The apparatus of claim 5, wherein said membrane comprises piezoelectric material.
7. The apparatus of claim 5, wherein said membrane comprises Aluminum Nitride.
8. The apparatus of claim 1, wherein said cap layer comprises a selectively permeable material.
9. The apparatus of claim 8, wherein said selectively permeable material is permeable when subject to a predetermined condition.
10. The apparatus of claim 1, wherein said cap layer comprises piezoelectric material.
11. The apparatus of claim 1, wherein said cap layer comprises Aluminum Nitride.
12. The apparatus of claim 1, comprising a Film Bulk Acoustic Resonator filter.
13. The apparatus of claim 1, wherein said electro-mechanical device comprises a Micro-Electro-Mechanical Systems device.
14. A Micro-Electro-Mechanical Systems device comprising:

- a membrane attached to a support structure having one or more sealed cavities.
15. The device of claim 14, wherein said support structure comprises:
 - a base structure; and
 - a cap layer having a first side attached to said base structure and a second side attached to said membrane;
 - a base structure attached to a second side of said cap layer,
 - wherein said one or more sealed cavities are encapsulated between said base structure and said cap layer.
 16. The device of claim 15, wherein said base structure comprises one or more protrusions attached to a base substrate, and wherein said one or more cavities are encapsulated between said cap layer, said base substrate and said protrusions.
 17. The device of claim 15, wherein said cap layer comprises piezoelectric material.
 18. The device of claim 15, wherein said cap layer comprises a selectively permeable material.
 19. The device of claim 18, wherein said selectively permeable material is permeable when subject to a predetermined condition.
 20. The device of claim 14, wherein said membrane comprises piezoelectric material.
 21. The device of claim 14, wherein said membrane comprises Aluminum Nitride.
 22. A process comprising:
 - producing a base structure having one or more recesses;
 - applying a layer of sacrificial material onto said base substrate to fill one or more of said recesses;
 - applying a cap layer to cover the sacrificial material in said recesses;
 - removing least part of the sacrificial material filling said recesses; and
 - applying one or more elements of an electro-mechanical device onto said cap layer.
 23. The process of claim 22, wherein said removing comprises causing at least part of said sacrificial material to permeate through said cap layer.
 24. The process of claim 23, wherein said causing comprises heating said sacrificial material.

25. The process of claim 22, wherein producing said base structure comprises applying one or more protrusions onto a base substrate.
26. The process of claim 22, wherein said sacrificial material comprises a sacrificial polymer.
27. The process of claim 22, wherein said one or more elements comprises a membrane.
28. The process of claim 22, wherein said one or more elements comprises at least one conductor.
29. The process of claim 22, wherein said electro-mechanical device comprises a Micro-Electro-Mechanical Systems device.